IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Makoto Moriyama et al.

Serial No.: 09/728,240 Art Unit: 3612

Filed : December 1, 2000

Examiner: PEDDER, DENNIS H

Title : HEAT-SHIELDING METHOD, COATED PRODUCT, AND CAR UPHOLSTERY

DECLARATION UNDER RULE 132

Honorable Commissioner of Patents and Trademarks,
Washington, D.C. 20231

Sir:

I, Makoto Moriyama, a citizen of Japan and having postal mailing address of 214-0021, Shukugawara 3-14-37-4, Tamaku, Kawasaki-shi, Kanagawa JAPAN, declare and say that:

In March 1984, I was graduated from Faculty of Science in Tokyo University of Science;

Since April 1984, up till the present, I have been employed by Nippon Paint Co., Ltd., engaged in the works of technique development for pipe coating for six years, engaged in the works of technique development for surface reforming of plastics using corona discharge for three years and engaged in the works of technique development for automobiles coatings for last ten years;

I am one of the inventors of the above-identified

application and am familiar with the subject matter thereof;

I have read the Official Action mailed and the references cited therein and I am familiar with the subject matter thereof;

I respectfully submit herewith my exact report thereon;

Experiments

In the experiments, "%" means "% by weight". Furthermore, aluminum pigments, zinc powder and zinc sulfate were added so that contents thereof in respective coating compositions were unified to be 40% in terms of PWC.

Experiment 1

Steel testpieces degreased, cleaned, and subjected to chemical conversion treatment, 30 cm × 40 cm × 0.8mm (thickness) each, were dip-coated in "POWER TOP V6" (Nippon Paint, gray electrodeposition coating), cleaned with water, and cured at 150℃.

The dry thickness of the electrodeposition coating film (primer layer) was 20 μm. Then, "ORGA P-2 8105" (Nippon Paint, intermediate coating) was spray-coated on the electrodeposition coating film on one side and "ORGA P-2-1 202B" (Nippon Paint, top coating) was further spray-coated in superimposition. The two successive coats were cured at 150℃ in one operation to form a multi-layer coating film. The dry thickness of the intermediate coating film and of the top coating film was

40 μm each.

Then, the reverse side of the testpiece formed with the above multilayer film was spray-coated with a leafing aluminum-containing coating composition of the following formulation, followed by room-temperature drying, to form a leafing aluminum-containing layer having a dry thickness of 30 μm and obtain a testpiece.

Formulation of leafing aluminum-containing coating composition

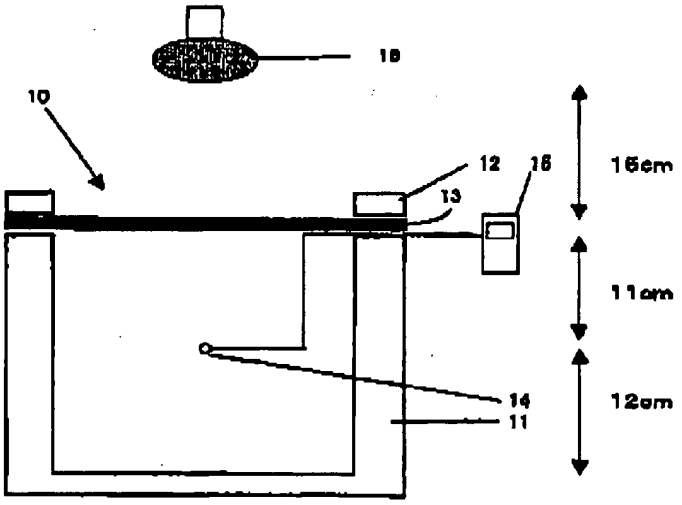
Acrylic resin (number average molecular weight 6000)	22.2%
Butylated melamine resin (number average molecular weight 1200)	9.5%
Leafing aluminum pigment ("AL PASTE 0670TS", manufactured by TOYO ALUMINUM)	3.5%
Additives (organic amide, amine, non-silicon surfactant, etc.)	5.2%
Solvent (a mixture of aromatic hydrocarbon, ester and alcohol solvents)	59.6%

Temperature measurement

The obtained testpiece was set in the thermometric test box 10 illustrated in Fig. 1 and evaluated for heat-barrier effect. The thermometric test box 10 comprises a body 11 made of a heat-insulating foam (polystyrene foam) and a frame 12 made of the same material. The thermometric test was carried out as follows. First,

the testpiece 13 was set on the body 11 so that the side thereof having the coating film obtained by applying the leafing aluminum-containing coating composition was located on the underside and secured in position with the frame 12. Then, a thermocouple 14 for box center temperature measurement was set in the center of the box 11 so that box center temperature could be read with the thermometer 15 ("HR 2500E", Yokogawa Electric). A 100 v, 200 W infrared lamp 16 ("Toshiba Ref Lamp RF", Toshiba) was set in a position 15 cm above the center of the testpiece 13 and the testpiece was irradiated with thermal rays. For 1 hour of irradiation, the temperature was measured continuously and the result was shown in Table 1 and Fig. 3.

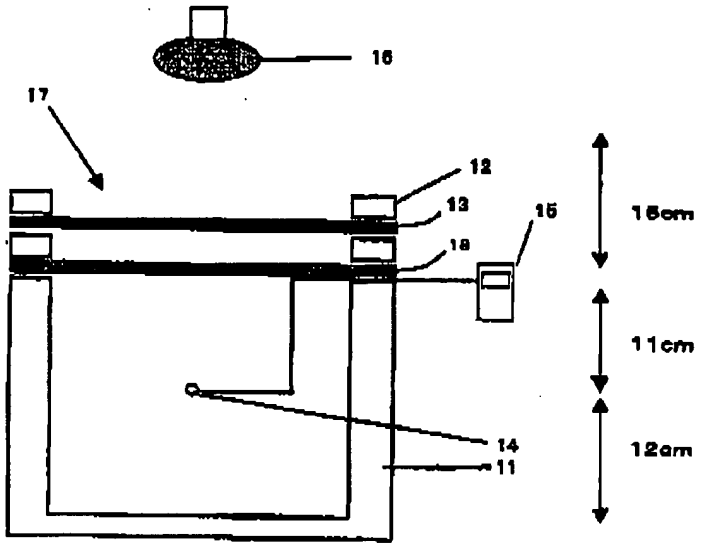
Figure 1



Furthermore, except that the thermometric test box 17 illustrated in Fig. 2 was used, the heat-barrier effect was evaluated as mentioned above. The thermometric test

box 17 was made by locating roof upholstery for automobiles 18 under the testpiece 13 in the test box 10. The results are shown in Table 1 and Fig. 4.

Figure 2



Experiment 2

Except that non-leafing aluminum pigment ("AL PASTE 7640NS", manufactured by TOYO ALUMINUM) was used instead of leafing aluminum pigment, the testpiece was obtained and the heat-barrier effect was evaluated as Experiment 1.

Experiment 3

Except that metal zinc powder ("Zinc Powder, Special grade", manufactured by Wako Pure Chemical Industries) was used instead of leafing aluminum pigment, the testpiece was obtained and the heat-barrier effect was

evaluated as Experiment 1.

Experiment 4

Except that zinc sulfate ("Zinc Sulfate (anhydride), content 95%", manufactured by Wako Pure Chemical Industries) was used instead of leafing aluminum pigment, the testpiece was obtained and the heat-barrier effect was evaluated as Experiment 1.

Experiment 5

Except that the leafing aluminum-containing coating composition was not applied, the testpiece was obtained and the heat-barrier effect was evaluated as Experiment 1.

Table 1

	Film thickness of heat-shielding coating film (μm)	Evaluation for heat-barrier effect	
		With roof upholstery	Without roof upholstery
		Box center temperature after 1 hour (°C)	Box center temperature after 1 hour (°C)
Experiment 1	26	27.4	30.8
Experiment 2	27	28.3	33.2
Experiment 3	25	29.0	36.8
Experiment 4	30	28.0	37.0
Experiment 5	-	30.2	38.8

Figure 3

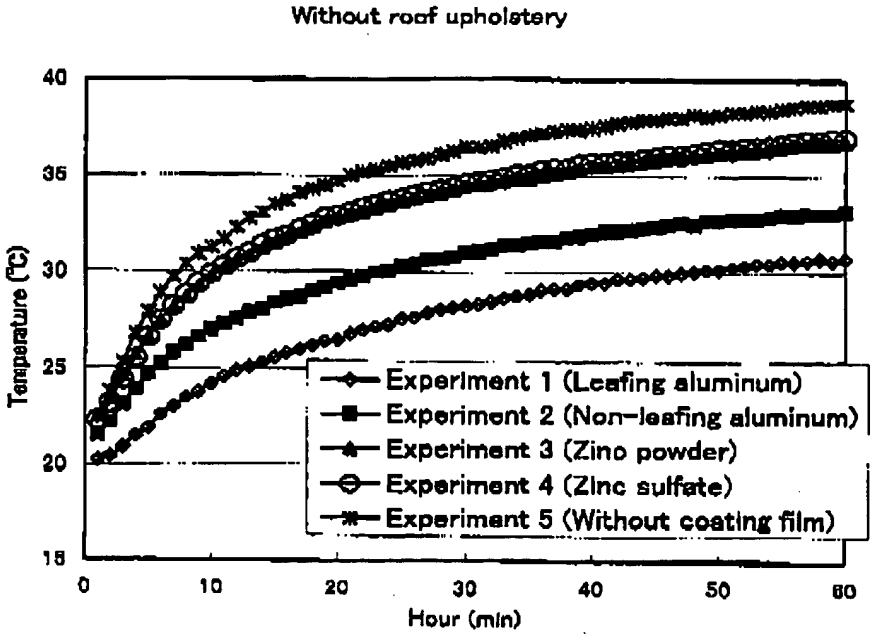
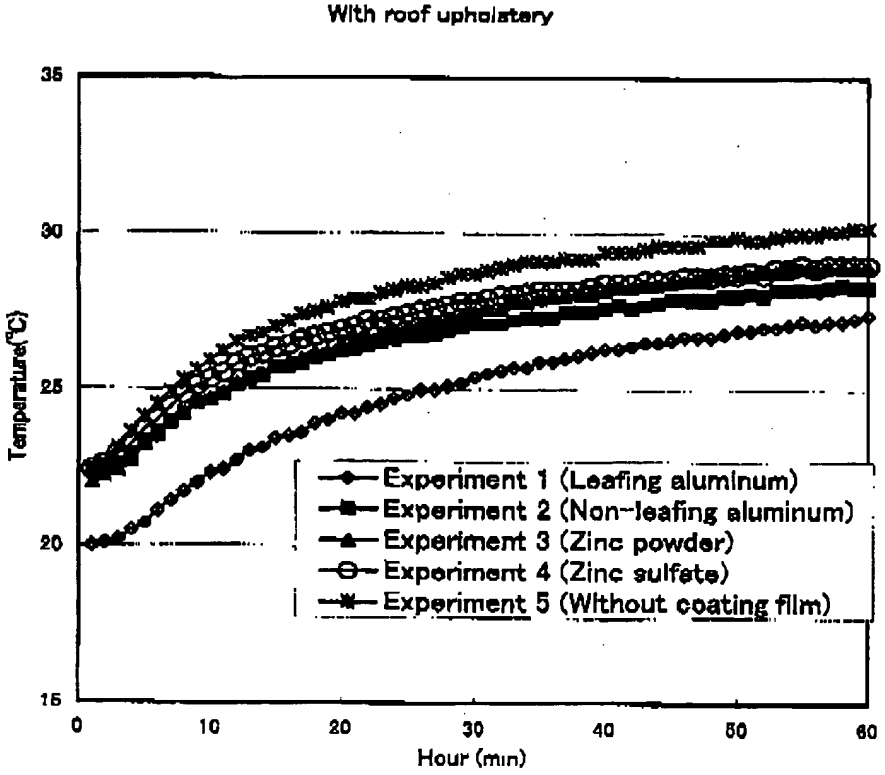


Figure 4



It is shown that leafing aluminum pigment and non-leafing aluminum pigment have high heat-barrier effect superior to metal zinc powder and zinc sulfate. Therefore, even though aluminum pigment, zinc, and zinc sulfate are disclosed similarly as conventionally known reflective pigment in this art, there is significant difference between effects imparted by using these pigments. So, it is not easy to use aluminum pigment, especially leafing aluminum pigment instead of zinc or zinc sulfate, and the present invention has patentability in using aluminum pigment not zinc or zinc sulfate to increase the heat-barrier effect.

I declare further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Signed this 17th day of FEB, 2004

Makoto Moriyama

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